IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Patent Application

Applicant(s): Amontov et al.
Docket No.: CH920020037US1
Serial No.: 10/539,726
Filing Date: July 19, 2006
Art Unit: 1637
Examiner: Angela Marie Bertagna

Title: Surface Treatment

REPLY BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
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Sir:

Appellant hereby replies to the Examiner's Answer, mailed October 14, 2010 referred to hereinafter as "the Examiner's Answer"), in an Appeal of the final rejection of claims 1, 4-14, 17 and 20-23 in the above-identified patent application.

REAL PARTY IN INTEREST

A statement identifying the real party in interest is contained in Appellant's Appeal Brief.

RELATED APPEALS AND INTERFERENCES

A statement identifying related appeals is contained in Appellant's Appeal Brief.

STATUS OF CLAIMS

A statement identifying the status of the claims is contained in Appellant's Appeal Brief.

STATUS OF AMENDMENTS

A statement identifying the status of amendments is contained in Appellant's Appeal Brief.

SUMMARY OF CLAIMED SUBJECT MATTER

A Summary of the Invention is contained in Appellant's Appeal Brief.

STATEMENT OF GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A statement identifying the issues presented for review is contained in Appellant's Appeal Brief.

CLAIMS APPEALED

A copy of the appealed claims is contained in an Appendix of Appellant's Appeal Brief.

ARGUMENT

Appellant incorporates by reference herein the disclosures of all previous responses filed in the present application.

Claim Rejections Under 35 USC §102(b)

Independent claim 1 was rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Church. Appellant respectfully submits, as detailed below, that the cited reference does not disclose each and every element of the independent claims, and as such, Appellant asserts that the claims are not anticipated by the Church reference.

By way of example, on page 11, the Examiner's Answer states that

> the arrays produced by the method of Church are randomly patterned, but Church teaches that the arrays are "randomly patterned" with respect to the **identity** of the molecules at each discrete location and further teaches that the array surface is patterned such that different molecules are present in different features (see, for example, column 1, line 64 - column 2, line 19). Thus, the production of a randomly patterned array does not preclude the formation of a homogeneous area comprising a monolayer on the flat surface.... (Emphasis in original)

Appellant respectfully disagrees with the above interpretation of the teachings of Church, and point to the Church reference, beginning on column 1, line 43, wherein it states that

> [t]he invention provides... amplifying in situ nucleic acid molecules of a first randomly-patterned, immobilized nucleic acid array comprising a heterogeneous pool of nucleic acid molecules affixed to a support, transferring at least a subset of the nucleic acid molecules produced by such amplifying to a second support, and affixing the subset so transferred to the second support to form a second randomly-patterned, immobilized nucleic acid array.... (Emphasis added)

Further, Appellant notes that beginning on column 1, line 64, Church teaches that

> [a]s used herein, the terms "randomly-patterned" or "random" refer to a non-ordered, non-Cartesian distribution (in other words, not arranged at pre-determined points along the x- and y axes of a grid or at defined `clock positions`, degrees or radii from the center of a radial pattern) of nucleic acid molecules over a support, that is not achieved through an intentional ***design*** (or program by which such a design may be achieved) or by placement of individual nucleic acid features. (Emphasis added)

Also, in column 2, lines 20-22, Church explains that

> the term "heterogeneous" is defined to refer to a population or collection of nucleic acid molecules that comprises a plurality of different sequences....

Accordingly, Appellant respectfully submits that Church explicitly teaches two separate limitations: (1) a randomly-patterned distribution; and (2) a heterogeneous collection of sequences used within that randomly-patterned distribution. Appellant asserts that the Examiner's Answer is referring merely to the "heterogeneous" limitation of Church in the argument cited above to allege that Church teaches *both* the heterogeneous collection limitation **and** the randomly-patterned distribution limitation. Appellant emphasizes, however, that the above-cited argument from the Examiner's Answer only properly applies to the "heterogeneous" limitation of Church, and that the "randomly-patterned distribution" limitation is a separate and additional requirement of the Church teachings that therefore preclude Church from teaching the step of producing a homogeneous area comprising a monolayer of molecules, as explicitly taught in independent claim 1.

Additionally, on page 11, the Examiner's Answer states that

> gels are only an exemplary embodiment of Church, who also teaches flat surfaces that support self-completing amplification reactions (see, e.g., column 4, lines 25-30, where Church teaches the use of nylon or cellulose surfaces).

Appellant notes that the cited portion of the reference (column 4, lines 25-30) teaches that

> [i]t is preferred that the support is semi-solid.
> Preferably, the semi-solid support is selected from the group that includes polyacrylamide, cellulose, polyamide (nylon) and cross-linked agarose, -dextran and -polyethylene glycol. (Emphasis added)

Appellant further notes that column 3, lines 21-24 of Church explicitly teach that

> [a]s used herein, the term "semi-solid" refers to a compressible matrix with both a solid and a liquid component, wherein the liquid occupies pores, spaces or other interstices between the solid matrix elements. (Emphasis added)

Accordingly, Appellant asserts that Church discloses techniques using swollen gels as the soft transfer medium, and that all such materials require a large fraction of water to be able to adsorb nucleic acids in the matrix. Appellant also submits that self-completing amplification cannot exist in a setting such as taught by Church because the surface in a gel is larger than on a flat surface such that it would not be possible to saturate the gel matrix and run into a self-completion.

Further, page 11 of the Examiner's Answer continues by stating that

> although Church teaches that preferred supports used to practice the method are semi-solid and include gels..., the reference is clearly not limited to these embodiments... (see, for example, column 3, lines 18-20, column 9, line 24 - column 10, line 22, and column 11, lines 19-37). (Emphasis in original)

Appellant notes that the portions of the Church reference cited in the Examiner's Answer all incorporate a "semi-solid" support or structure, which, as explained above, Church explicitly teaches as including both a solid and a liquid component. Consequently, Appellants respectfully traverse the argument that the Church reference "is clearly not limited to these embodiments."

Additionally, on page 12, the Examiner's Answer states that

> the discussion of Church at column 9 clearly indicates that, although a limited amount of diffusion can occur, it does **not** occur to an extent that amplification accuracy is destroyed... because tolerance of mismatches is only an optional feature of the methods of Church. (Emphasis in original)

Appellant respectfully traverses the assertion that tolerance of mismatches is only an optional feature of Church, and notes that column 11, lines 60-61 of Church acknowledges that "[t]ypically..., it is expected that a certain degree of mismatch at the priming site is tolerated."

As such, for at least the reasons detailed above, Appellant respectfully submits that Church does not set forth the claimed elements of, for example, producing a "monolayer comprises producing a homogeneous area, wherein the homogeneous area comprises a monolayer of molecules on the flat surface, and wherein the monolayer of molecules on the flat surface has no diffusive seed molecules that can relocate and destroy amplification accuracy."

Consequently, Appellant respectfully submits that Church does not teach or suggest all of the limitations of claim 1. As discussed in MPEP §2131, it is well-established law that a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*,

814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987). Moreover, the cited reference must show the "identical invention . . . in as complete detail as is contained in the . . . claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Appellant asserts that the rejection based on Church does not meet this basic legal requirement in that Church fails to disclose each and every element of independent claim 1.

Dependent Claims

Because independent claim 1 is patentable, dependent claims 4-7, 9, 10, 14, 17 and 20-22 which depend from independent claim 1, include all limitations of independent claim 1 and are therefore also patentable. Certain dependent claims are also independently patentable for the features provided therewith, in combination with the limitations provided by independent claim 1.

For example, regarding the assertions in connection with claim 4 on page 13 of the Examiner's Answer, Appellant respectfully traverses the cited argument and reemphasizes that Church teaches the use of reverse transcription not as a type of amplification, but rather as a means to create reverse transcripts which are the subject of an amplification process themselves. As noted, column 5, lines 56-57 of the Church references expressly teaches that "[i]t is preferred that the method further comprises the step of amplifying the reverse transcripts."

Consequently, withdrawal of the §102(b) is respectfully requested.

Claim Rejections Under 35 U.S.C. §103(a)

Claim 8 is rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Church in view of Richter. As detailed above, Appellant reiterates that Church does not teach or suggest every claim limitation of independent claim 1. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Furthermore, if an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Also, claims 11 and 13 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Church in view of Korlach. Appellant reiterates that Church does not teach or suggest every claim limitation of independent claim 1. Further, Appellant respectfully traverses the argument on

page 16 of the Examiner's Answer, and reemphasizes that in paragraph [0060], Korlach does not teach controlling amplification by way of electrical or hydrodynamic force, but rather teaches

> the succession of steps (outlined in FIG. 2) that is used to carry out the sequencing procedure of the present invention. In essence, in this procedure, an incorporated nucleotide analog will be distinguished from unincorporated ones (randomly diffusing through the volume of observation or being convected through it by hydrodynamic or electrophoretic flow) by analyzing the time trace of fluorescence for each distinguishable label simultaneously. (Emphasis added)

Consequently, Appellant respectfully submits that the two references nonetheless do not teach or suggest the claimed elements of claims 11 and 13.

Additionally, claim 12 is rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Church in view of Mian. Appellant again notes that, as detailed above, Church does not teach or suggest every claim limitation of independent claim 1. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Furthermore, if an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Thus, Appellant requests withdrawal of the section 103 rejections of the noted claims.

For at least the reasons given above, Appellant respectfully requests withdrawal of the pending rejection of claims 1, 4-14, 17 and 20-22. The application is asserted to be in condition for allowance, and favorable action thereon is respectfully solicited.

Respectfully submitted,

Date: December 13, 2010

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CLAIMS APPENDIX

1. A method for producing a monolayer of molecules on a surface, the method comprising:

loading a stamp with seed molecules;

transferring seed molecules from the stamp to a flat surface, wherein the transferring comprises transferring a fraction of the seed molecules loaded on the stamp to the flat surface and wherein the transferring comprises adsorbing the seed molecules to the stamp and adsorbing the seed molecules to the flat surface, the adsorption of the seed molecules to the stamp being stronger than the adsorption of the seed molecules to the flat surface; and

self-completing amplification of the seed molecules via an amplifying reaction to produce the monolayer on the flat surface, wherein self-completing amplification of the seed molecules via an amplifying reaction to produce the monolayer comprises producing a homogeneous area, wherein the homogeneous area comprises a monolayer of molecules on the flat surface, and wherein the monolayer of molecules on the flat surface has no diffusive seed molecules that can relocate and destroy amplification accuracy.

2. (Canceled)

3. (Canceled)

4. A method as claimed in claim 1, wherein the amplifying comprises linear amplification of the seed molecules.

5. A method as claimed in claim 1, wherein the amplifying comprises exponential amplification of the seed molecules.

6. A method as claimed in claim 1, wherein the amplifying comprises directional amplification of the seed molecules.

7. A method as claimed in claim 6, wherein the seed molecules are directionally amplified to form conductive structures.

8. A method as claimed in claim 6, comprising electroless plating of the directionally amplified seed molecules with a metal.

9. A method as claimed in claim 6, wherein the directional amplification is controlled by the geometry of the seed molecule.

10. A method as claimed in claim 6, wherein the directional amplification is controlled by application of an external force.

11. A method as claimed in claim 10, wherein the external force comprises an electrical force.

12. A method as claimed in claim 10, wherein the external force comprises a magnetic force.

13. A method as claimed in claim 10, wherein the external force comprises a hydrodynamic force.

14. A method as claimed in claim 1, wherein the amplifying comprises a polymerase chain reaction.

15. (Canceled)

16. (Canceled)

17. A method as claimed in claim 1, wherein the amplifying comprises the use of an in vitro translation system to produce a monolayer of protein.

18. (Canceled)

19. (Canceled)

20. A method as claimed in claim 1, wherein the monolayer protects the surface from etchants.

21. A method as claimed in claim 1, wherein the monolayer comprises DNA.

22. A method as claimed in claim 1, comprising repeating the transferring and amplifying on plural surfaces before reloading the stamp with seed molecules.

23. (Withdrawn) A biosensor comprising surface treated with a method as claimed in claim 1.

EVIDENCE APPENDIX

There is no evidence submitted pursuant to § 1.130, 1.131, or 1.132 or entered by the Examiner and relied upon by Appellants.

RELATED PROCEEDINGS APPENDIX

There are no known decisions rendered by a court or the Board in any proceeding identified pursuant to paragraph (c)(1)(ii) of 37 CFR 41.37.

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